

REMARKS

Summary of Office Action

As an initial matter, Applicants note with appreciation that the Examiner has withdrawn the rejections set forth in the previous Office Action.

Claims 22-25, 28-41 and 43 are rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Sondhe et al., U.S. Patent No. 5,340,652 (hereafter "SONDHE"), in view of Gajewski, U.S. Patent No. 4,895,806 (hereafter "GAJEWSKI"). In this regard, the Examiner is respectfully requested to make GAJEWSKI officially of record on a Form PTO-892.

Claims 26, 27 and 42 are rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over SONDHE in view of GAJEWSKI and in view of Motsinger et al., U.S. Patent No. 3,217,536 (hereafter "MOTSINGER").

Response to Office Action

Reconsideration and withdrawal of the rejections of record are respectfully requested, in view of the following remarks.

Response to Rejection of Claims 22-25, 28-41 and 43 under 35 U.S.C. § 103(a)

Claims 22-25, 28-41 and 43 are rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over SONDHE in view of GAJEWSKI. The rejection essentially alleges that SONDHE discloses an article comprising an epoxy base coat and a urethane top coat that can be applied at ambient temperatures to the epoxy base coat, but fails to disclose the presently claimed urethane topcoat. The rejection further alleges that

GAJEWSKI discloses a polyurethane composition that can be applied to substrates to be coated without the need for molds and comprises the reaction product of an isocyanate-terminated polyurethane prepolymer (which according to the Examiner qualifies as aromatic polyisocyanate), and a curative agent that comprises a polyol as recited in the instant claims, an aromatic diamine and an aliphatic amine. The Examiner also takes the position that one of ordinary skill in the art would have been motivated to replace the urethane topcoat of SONDHE by the polyurethane composition of GAJEWSKI.

Applicant respectfully traverses this rejection. In particular, Applicant (strongly) disagrees with the Examiner that the isocyanate-terminated polyurethane prepolymer used for the production of the polyurethane composition of GAJEWSKI qualifies as an aromatic polyisocyanate merely because it contains terminal isocyanate groups. It is pointed out that the Examiner has not provided any textbook (or other written) evidence which would show that those of skill in the art consider isocyanate-terminated polyurethane prepolymers to be (aromatic) polyisocyanates.

It further is submitted that it is apparent that a polyisocyanate and a isocyanate-terminated polyurethane prepolymer differ significantly, for example, in that a polyisocyanate does not contain urethane groups formed by the reaction of isocyanate groups with hydroxy groups of polyols.

At any rate, the very document that the Examiner is relying on in this regard, i.e., GAJEWSKI, clearly distinguishes between (aromatic) polyisocyanates (i.e., diisocyanates) and isocyanate-terminated polyurethane prepolymers. For example, according to col. 2, lines 17-20 of GAJEWSKI "the term 'isocyanate-terminated polyurethane prepolymer' means the reaction product formed when an excess of an

organic diisocyanate monomer is reacted with a polyol." Further, according to col. 2, lines 27-28 of GAJEWSKI, "[t]he organic diisocyanate monomer can be an aromatic or aliphatic diisocyanate."

Also, according to the terminology applied by the Examiner, the isocyanate-terminated polyurethane prepolymer of GAJEWSKI would be an (aromatic) polyisocyanate which could be used for the preparation of a (another) isocyanate-terminated polyurethane prepolymer, which in turn would be an (aromatic) polyisocyanate which could be used for the preparation of a (another) isocyanate-terminated polyurethane prepolymer, etc.

For the above reason alone, even a combination of the teachings of SONDHE and GAJEWSKI would not result in the claimed subject matter.

It further is submitted that even if one were to assume, *arguendo*, that the urethane composition of GAJEWSKI corresponds to the gel coat material recited in the instant claims, it is not seen what would prompt one of ordinary skill in the art to replace the urethane top coat of SONDHE by the polyurethane composition of GAJEWSKI.

For example, the top coat composition of SONDHE can simply be made by mixing the polyisocyanate and the polyol components. Making the polyurethane composition of GAJEWSKI requires an additional step, i.e., the preparation of a urethane prepolymer, which is then combined with the curative agent. It is not apparent that the inconvenience of having to employ an extra step for making the urethane topcoat for the article of SONDHE would be (over)compensated by any advantage that cannot be obtained by using the urethane top coat taught by SONDHE, and neither has the Examiner provided any comments in this regard.

Further, one of ordinary skill in the art would not even know if the epoxy base coat of SONDHE is compatible with the polyurethane composition of GAJEWSKI. For example, in contrast to the polyurethane composition of GAJEWSKI (and the epoxy base coat of SONDHE) the preparation of the urethane top coat of SONDHE does not involve any amines.

Also, it would not be known to one of ordinary skill in the art if there is sufficient adhesion between the epoxy base coat of SONDHE and the polyurethane composition of GAJEWSKI. Applicant notes that in this regard the Examiner asserts that “from personal work experience, the Gajewski reference discloses polyurethanes suitable for the production of industrial rolls such as paper mill rolls. Industrial sized polyurethane paper mill rolls consist of two layers, a base layer, which is normally an epoxy resin, and a topcoat layer which is normally the polyurethane resin disclosed by Gajewski. A person of ordinary skill in the art would understand that when applying the polyurethane topcoat to the epoxy basecoat substantial adhesion between the synthetic coat and the gel coat needs to be adequate in order to avoid catastrophic disaster once the industrial roll is put into place in a paper making facility. Furthermore, appropriate adhesion between the basecoat and topcoat is achieved because the polyurethane coat is in a gel state as it is being applied to the epoxy basecoat, which provides a sufficient lamination time (because the components in the polyurethane topcoat) that enables the roll to be completely covered before finally curing the entire roll to be shipped for paper making.” Paragraph bridging pages 4 and 5 of the instant Office Action.

In this regard, it is submitted that the Examiner's assertions are merely conclusory and not supported by any (written or other) evidence whatsoever. Clearly, personal work experience cannot replace verifiable information.

At any rate, regarding the Examiner's assertion that “[i]ndustrial sized polyurethane paper mill rolls consist of two layers, a base layer, which is normally an epoxy resin, and a topcoat layer which is normally the polyurethane resin disclosed by Gajewski”, it is noted that in col. 2, lines 34 to 36 thereof, GAJEWSKI mentions that “U.S. Pat. No. 4,571,798 describes a method wherein paper mill rolls are coated by spraying a quick-gelling polyurethane onto a core.” Below are excerpts from this patent (to Adams, hereafter “ADAMS”), emphasis added:

A urethane covered metal press roll is provided by spray coating the roll body with a quick jelling resin formulation creating isolated small pores giving the cover a stone-like texture. The coating is applied to a desired depth by successive passes of a spray jet over the rotating roll body. The resin quickly jells and after being cured, the cover is ground to a desired diameter and finish. Abstract

This invention relates to rolls covered with elastomeric material for many uses in paper making machinery, and particularly deals with metal rolls spray coated with a polyurethane elastomer to any desired thickness and hardness without the need for molds or ovens and having a stone-like microstructure provided by closed isolated pores desirable for sheet release in paper making machinery such as press roll and calender stack assemblies.

2. Prior Art

Heretofore, elastomer covered paper machine rolls could only be produced with very expensive and extensive capital equipment, labor costs, and time delays. Such rolls had a short wear life, required bonding techniques for the interface between the cover and the metal roll, and the use of curing ovens, build up stations and casting molds.

It would then be an improvement in this art to produce elastomer covered, paper machine metal rolls without heretofore required extensive capital equipment and labor costs and with a longer wear life than heretofore achieved. It would especially be an improvement in the art to provide polyurethane covered paper

machine press rolls having a stone-like texture provided by closed pores or bubbles facilitating paper release and resisting crushing in high pressure nips.

SUMMARY OF THE INVENTION

This invention now provides polyurethane covered metal rolls for supporting and conveying paper through high pressure nips of paper making machine assemblies such as press rolls, calender stacks, and the like. The elastomer cover can have any desired thickness and hardness and contains a myriad of closed isolated bubbles or pores, but is not porous. The cover is formed by spray coating, directly onto a metal roll, a solventless two component urethane resin formulation composed of a isocyanate terminated prepolymer cured with a polyol and a catalyst. The resin components are mixed immediately prior to being fed to a spray gun and are maintained under pressure to feed the gun. The formulation quickly jells on the rolls so that no molds or curing ovens are needed.

In a preferred arrangement, a steel roll has its journals mounted in bearings, and is rotated at a selected rate. A spray gun deposits the resin on the rotating roll being reciprocated along the length of the roll at a selected rate. The speed of rotation of the roll and the rate of longitudinal advancement of spray gun are correlated to provide a coat of the desired depth. Successive coatings are applied to build up a cover of the desired thickness with the underlying coat quickly jelling to accept another layer of the resin. Col. 1, lines 6-58.

A press roll which comprises a metal roll body and a spray deposited impervious elastomer cover around and secured to said body having a micro structure containing small isolated closed pores throughout the thickness thereof and a finished stone-like peripheral surface with uncovered pores isolating a myriad of smooth areas surrounded by seams defined by the walls of the uncovered pores, and said pores beneath said peripheral surface remaining isolated and closed to maintain the imperviousness of the cover. Claim 1.

None of the above passages of ADAMS mentions an epoxy layer or any other layer between the metal core and the polyurethane elastomer. Neither is such a layer mentioned in any other passage of ADAMS, which appears to contradict the Examiner's corresponding allegations.

Regarding instant claims 25 and 43, it additionally is pointed out that these claims recite (*inter alia*) that the synthetic resin is applied onto the polyurethane gel coat

material. The Examiner has not provided any explanation as to why this is allegedly rendered obvious to one of ordinary skill in the art by any of the cited documents.

Applicant notes that the only cited document that relates to a combination of a synthetic resin (epoxy) and a polyurethane is SONDHE. In this regard, the abstract of SONDHE states, *inter alia* (emphasis added):

An article generally comprises an epoxy base coat and a urethane top coat which has particular use for application. ... The two-part epoxy composition can be applied to a road with the urethane composition coated thereon whereupon it serves as a lane marker. The urethane composition has exceptional weatherability, abrasion-resistance and non-yellowing characteristics. Various reflective compounds such as glass beads can be applied thereto which are partially embedded therein and have good night as well as wet night reflective properties.

Further, in col. 4, lines 23-33 SONDHE states (emphasis added):

Articles in the form of a laminate or coated substrates are formed by generally adding a layer of the urethane composition to the epoxy composition. The epoxy composition has good bonding to surfaces such as industrial floors, garage decks, i.e. concrete and steel structures, storage tanks, roads including concrete and asphalt and the like, and hence generally serves as the substrate interface or base layer. The urethane composition has good weatherability resistance as well as generally good abrasion resistance and therefore serves as a good durable top coat.

Accordingly, SONDHE explicitly teaches applying the urethane composition onto the epoxy composition, not vice versa. It is not seen that it is obvious to one of ordinary skill in the art to reverse the order taught by SONDHE and to apply the epoxy composition of SONDHE (which exhibits good bonding to surfaces) as a top coat and the urethane composition of SONDHE (which exhibits good weatherability resistance and good abrasion resistance) as a base coat, i.e., to coat the urethane composition with the epoxy composition to thereby forfeit the particular advantages of both compositions pointed out by SONDHE.

Applicant submits that for at least all of the foregoing reasons, the Examiner has failed to establish a *prima facie* case of obviousness of the subject matter of any of the present claims in view of SONDHE and GAJEWSKI. Accordingly, withdrawal of the instant rejection is warranted, which action is respectfully requested.

Response to Rejection of Claims 26, 27 and 42 under 35 U.S.C. § 103(a)

Claims 26, 27 and 42 are rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over SONDHE in view of GAJEWSKI and in view of MOTSINGER".

Applicant respectfully traverses this rejection as well. In particular, it is noted that claims 26, 27 and 42 are dependent claims and are not rendered obvious for at least all of the reasons which are set forth above in connection with the claims from which they depend. MOTSINGER apparently is unable to cure the deficiencies of SONDHE and GAJEWSKI.

Moreover, it is not seen that one of ordinary skill in the art would be motivated to combine the disclosure of MOTSINGER with the disclosure of SONDHE and/or GAJEWSKI. For example, MOTSINGER mentions (foamed) polyurethanes and polyester or epoxy resins only generically as examples of suitable materials for the outer surface of the inner shell and the outer shell of the force vector transducer taught therein, without giving any details regarding the composition or production of these materials.

It further is not seen that someone who wishes to modify the teaching of SONDHE (relating to epoxy resin/polyurethane laminates for use as road lane markers; see, e.g., abstract of SONDHE) would expect to find any useful information in this regard in a document which relates to force vector transducers which are especially adapted for

measuring both the direction and the extent of the three force components of a moving current of fluid such as air or water (see, e.g., col. 1, lines 9-13 of MOTSINGER).

Applicant submits that for at least all of the foregoing reasons, SONDHE GAJEWSKI and MOTSINGER are unable to render obvious the subject matter of any of the claims of record, wherefore withdrawal of the instant rejection is warranted as well.

CONCLUSION

In view of the foregoing, it is believed that all of the claims in this application are in condition for allowance, wherefore an early issuance of the Notices of Allowance and Allowability is respectfully solicited. In this regard, it is noted that a Supplemental Information Disclosure Statement is being filed concurrently herewith. Accordingly, the Examiner is respectfully requested to indicate consideration of the Supplemental Information Disclosure Statement by returning a duly initialed and signed copy of the Form PTO-1449 submitted therein with the next communication from the Patent and Trademark Office.

Respectfully submitted,
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